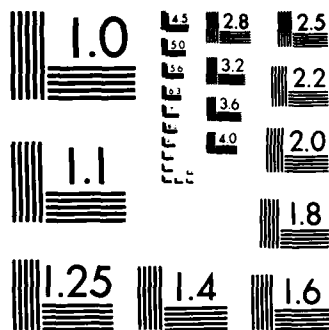


AD-A174 866 DEPARTMENT OF DEFENSE INSTRUMENTATION AWARD(U) MARYLAND 1/1
UNIV COLLEGE PARK W W DESTLER 01 JUL 85
AFOSR-TR-86-2031 AFOSR-84-0267

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MICROCOPY RESOLUTION TEST CHART
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<p>These funds were used to purchase a complete fast digital data acquisition system now completely installed in the Charged Particle Beam Laboratory at the University of Maryland. This instrumentation, consisting of five channels of fast digitization (two donated by the University) controlled by a DEC 11/73 computer, is now assembled in a shielded room with trench access to all of the experiments underway in the laboratory. The projects of Department of Defense interest supported by this instrumentation are listed below: Propagation of Intense Charged Particle Beams into Vacuum, Propagation of short Burst, High Power Microwave Pulses through Neutral and Ionized Media, Free Electron Lasers Driven by Electromagnetic Pump Waves, and High Power Microwave Radiation from a Relativistic Backward wave oscillator.</p> <p style="text-align: center;">DTIC FILE COPY</p>			
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AFOSR-TR. 86-2031

DEPARTMENT OF DEFENSE INSTRUMENTATION AWARD

Contract No. AFOSR-84-0267

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FINAL SCIENTIFIC REPORT

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH (AFSC)
NOTICE OF SUBMITTAL TO DTIC

This technical report has been reviewed and is
approved for public release IAW AFR 190-12.
Distribution is unlimited.

MATTHEW J. KEEPER

Chief, Technical Information Division

Submitted to

Air Force Office of Scientific Research

Prepared by

The Electrical Engineering Department and
The Laboratory for Plasma and Fusion Energy Studies
University of Maryland
College Park, Maryland 20742

86 12 04 014

FINAL SCIENTIFIC REPORT

Submitted to: Air Force Office of Scientific Research

Submitted by: Electrical Engineering Department
Laboratory for Plasma and Fusion Energy Studies
University of Maryland
College Park, Maryland 20742

Principal Investigator: William W. Destler, Professor
Electrical Engineering Department

Title of Research: "Department of Defense Instrumentation Award"

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These funds were used to purchase a complete fast digital data acquisition system now completely installed in the Charged Particle Beam Laboratory at the University of Maryland. A complete list of equipment purchases, including items purchased with matching funds from the University, follows this summary.

This instrumentation, consisting of five channels of fast digitization (two donated by the University) controlled by a DEC 11/73 computer, is now assembled in a shielded room with trench access to all of the experiments underway in the laboratory. Cable has been run to ongoing experiments and software has been written and tested for each application. This system is now fully operational. The projects of Department of Defense interest supported by this instrumentation are listed below:

Propagation of Intense Charged Particle Beams into Vacuum

This work, supported by AFOSR, involves experimental and theoretical studies of the propagation of intense relativistic electron beams into vacuum after passing through a localized ion source. Under proper conditions, the electrons can drag neutralizing ions into the vacuum region to provide a neutralizing channel through which the beam can propagate.

Propagation of Short Burst, High Power Microwave Pulses through Neutral and Ionized Media

This work, also supported by AFOSR, involves experimental and theoretical studies of the extent to which very short bursts (1-5 ns) of

high power microwave radiation can propagate through the atmosphere or ionosphere without causing breakdown of the media. Such work has relevance to directed energy applications and high power radar sources.

Free Electron Lasers Driven by Electromagnetic Pump Waves

These studies involve the use of a high power electromagnetic wave produced by a relativistic backward wave oscillator as the wiggler pump field in a free electron laser. Funded by ONR, such configurations may allow very high frequency FEL operation without the high electron energies usually required.

High Power Microwave Radiation from a Relativistic Backward Wave Oscillator

These experiments, supported by the Army through Harry Diamond Laboratories, involve the production of high power microwave radiation (100-1000 MW) using a relativistic electron beam driven backward wave oscillator.

AFOSR-84-0267 (01-5-28100) DOD Grant

Contractor Acquired Equipment

<u>Date Posted</u>	<u>Description</u>	<u>Cost</u>
10/84	High Speed Transient Recording System, Tektronix Md1. 7912A2 Main Frame Digitizers (3 each)	\$73,176.00
	Vertical Amplifier, Plug-In Units 7A29 (3 each)	7,500.00
	Programmable Timebase Plug-in Units 7B90P (3 each)	9,396.00
11/84	Microprocessor DEC LSI-11/73 Hamilton Avnet Inc.	1,733.00
9/85	Thinkjet Printer, Hewlett Packard Model 2225D, Memory Systems (2 each)	660.02
3/85	Small construction components	100.13
6/85	Component - Consolidated Electronics	451.47
	Tektronix, Supplies	28.00
3/85	Supplies	33.00
	Total	<u>\$93,077.62</u>

Government Furnished Equipment - None

Matching funds on 01-1-30171

<u>Req.</u>	<u>P.O.#</u>	<u>Vendor</u>	<u>Amount</u>
2	T203178	Natl. Instruments	2,051.00
5	204562	Electronic MRT (Imagen)	11,779.99
	204553	Imagen c/o Elec. Mkt.	470.00
7	204462	Graphon Corp.	2,990.00
26	206645	CTL-Zenith	702.00
27	206648	CTL-Zenith	3,935.97
			780.00
			360.00
		Total	<u>\$22,373.98</u>

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